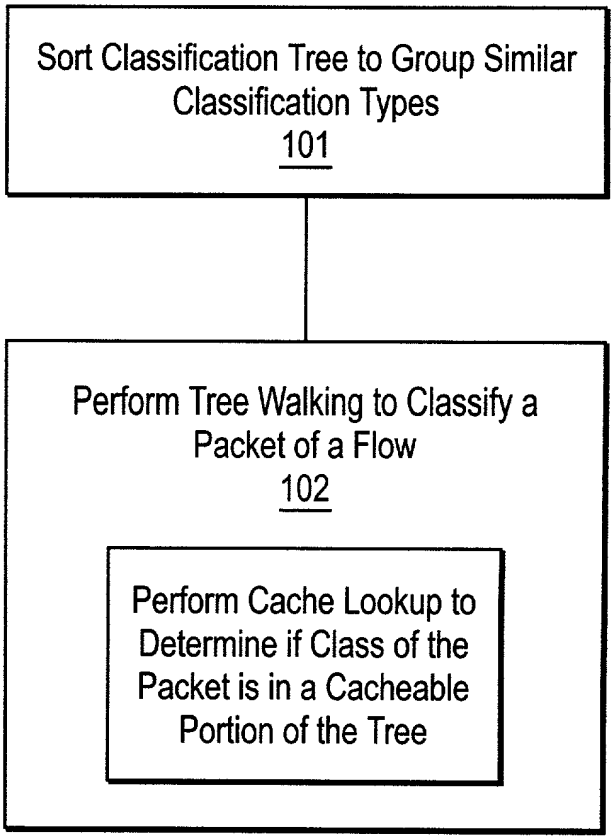
Sort Classification Tree to Group Similar Classification Types
101
Perform Tree Walking to Classify a Packet of a Flow
102
Perform Cache Lookup to Determine if Class of the Packet is in a Cacheable Portion of the Tree

FIG. 1

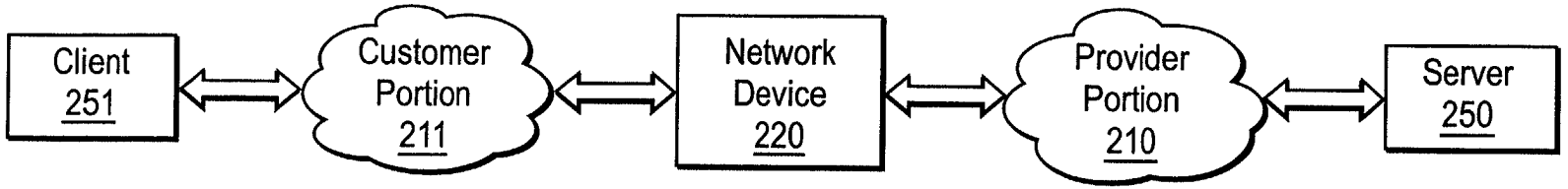
Client
251
Customer
Portion
211
Network
Device
220
Provider
Portion
210
Server
250

FIG. 2

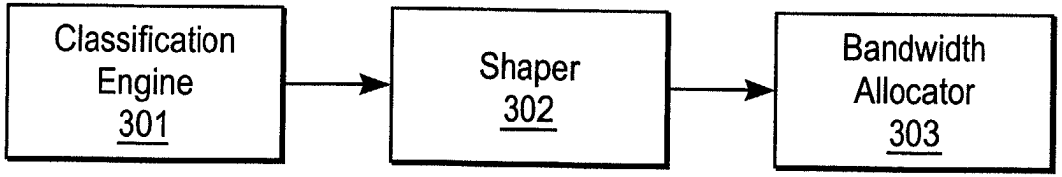
Classification
Engine
301
Shaper
302
Bandwidth
Allocator
303

FIG. 3

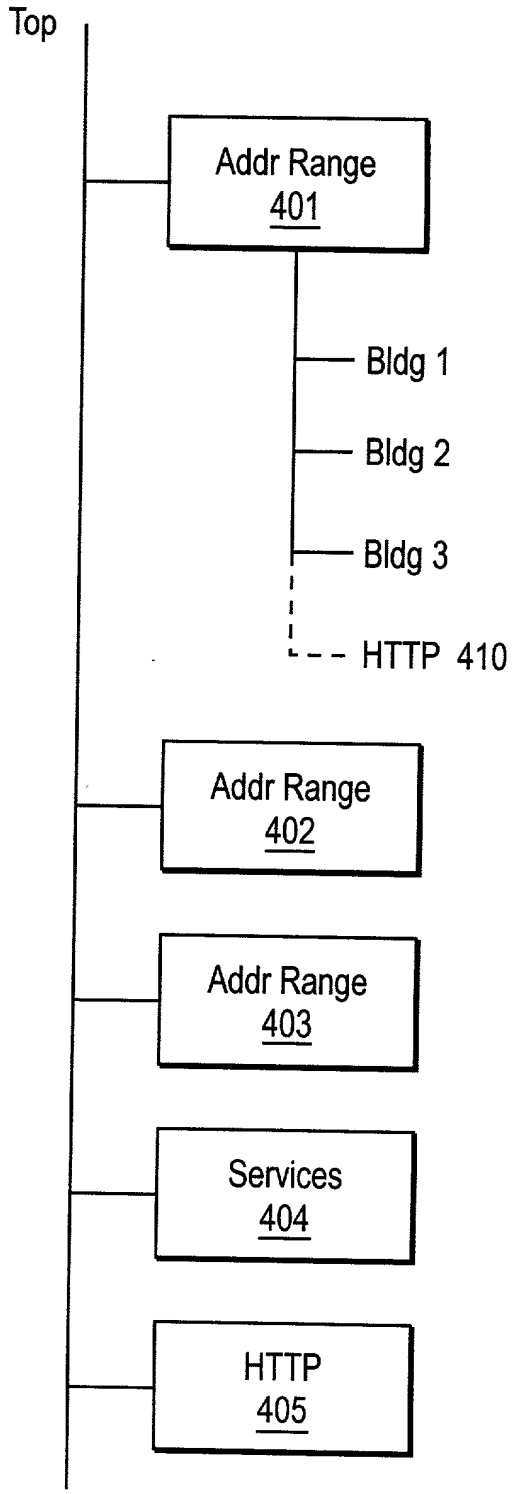
Top
Addr Range
401
Bldg 1
Bldg 2
Bldg 3
HTTP 410
Addr Range
402
Addr Range
403
Services
404
HTTP
405

FIG. 4

Classification Tree Example

TC-0
TC-1 C1 ← start of C1 cacheables (address group)
TC-2 C1
TC-3 ← end of C1 cacheables
TC-4 C2 ← start of C2 cacheables (protocol type group)
TC-5 C2
TC-6 C3 ← start of C3 cacheables, end of C2 cacheables, F1 hits TC-6
TC-7 ← end of C3 cacheables (port matching group)
DEFAULT

FIG. 5

Case 1: First packet of Flow1 (F1) is classified as TC6.

			Pass Number through the While Loop				
data	1st	2nd	3rd	4th	5th	6th	7th
tclass	TC-0,1 TC-1,11	TC-2,11	TC-3,11	TC-4,11	TC-5,11	TC-6,11	
inCache	FALSE,2	TRUE,9	FALSE,12		TRUE,9		TRUE,9
cacheProc		C1,6			C2,6		C3,6
cacheEnd		TC-3,6			TC-6,6		TC-7,6
C1 add			F1,12 NF*				
C2 add						F1,12 NF*	
C3 add							F1,10F*

*NF and F represent NOT FOUND and FOUND.

FIG. 6

Case 2: Second packet of Flow1 (F1) is classified as TC6.

			Pass Number through the While Loop	
data	1st	2nd	3rd	4th
tclass	TC-0,1 TC-1,11	TC-3,8 TC-4,11	TC-6,8	TC-6,7
inCache	FALSE,2			
cacheProc		C1,6	C2,6	C3,6
cacheEnd		TC-3,6	TC-6,6	TC-7,6
C1 lookup		NOTFOUND,6		
C2 lookup			NOTFOUND,6	
C3 lookup				FOUND,6

FIG. 7

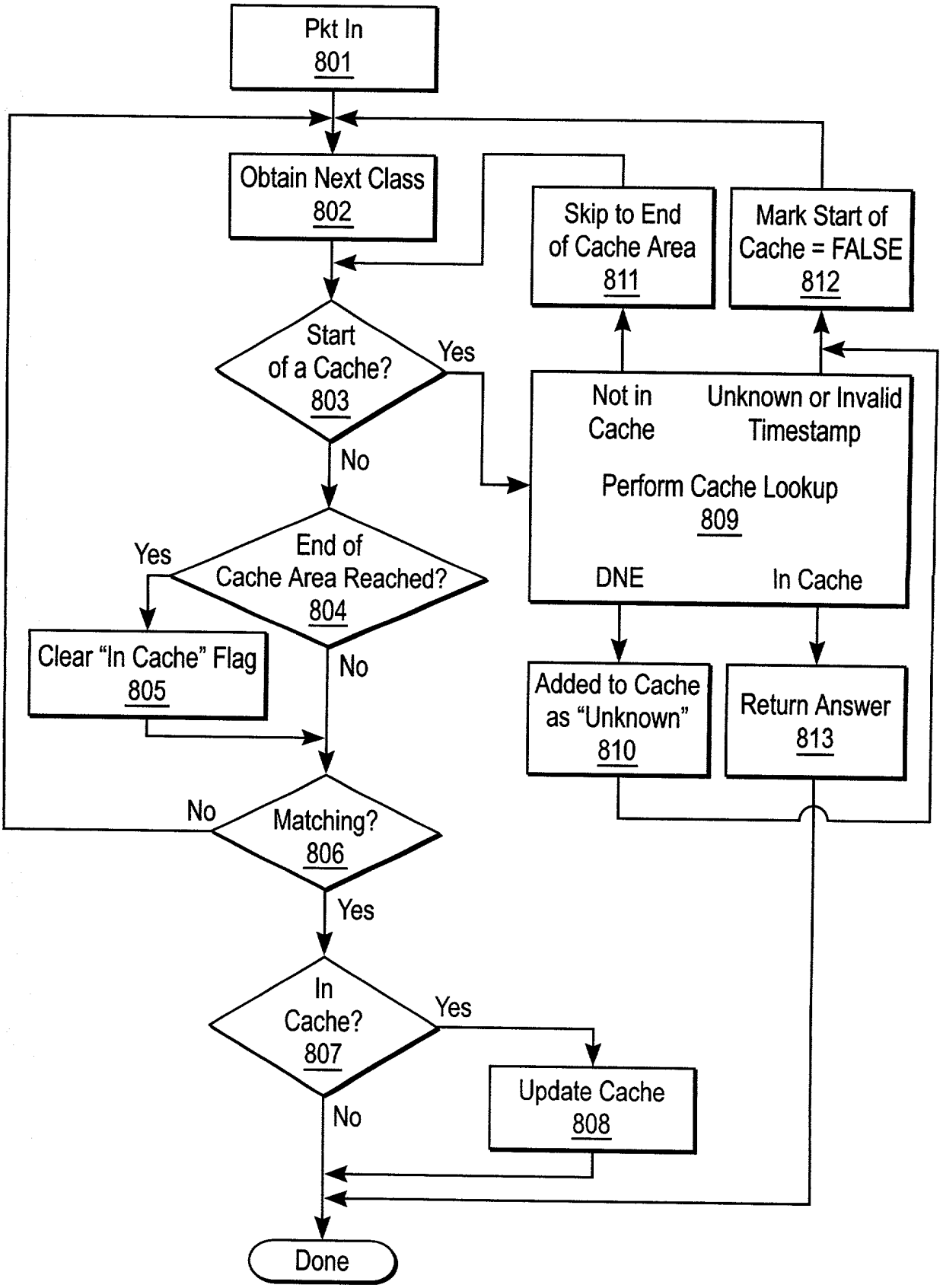
Pkt In
801
Obtain Next Class
802
Start
of a Cache?
803
Yes
No
End of
Cache Area Reached?
804
Yes
No
Clear "In Cache" Flag
805
Matching?
806
No
Yes
In
Cache?
807
Yes
No
Update Cache
808
Done
Skip to End
of Cache Area
811
Mark Start of
Cache = FALSE
812
Not in
Cache
Unknown or Invalid
Timestamp
Perform Cache Lookup
809
DNE
In Cache
Added to Cache
as "Unknown"
810
Return Answer
813

FIG. 8